

I. AMENDMENTS TO THE CLAIMS

Please cancel claim 50.

Please add or amend the claims as indicated.

5 I claim:

1. (currently amended) An apparatus for selecting a menu option from a plurality of menu options, said apparatus comprising:

- 10 (a) a display screen;
- (b) means for at least partially delimiting a plurality of selectable regions, each of the selectable regions outside the display screen and each associated respectively with a displayed menu option;
- (c) movement related signal receiving means for receiving a movement related signal indicating successive locations with respect to the display screen; and
- (d) selection means, responsive to a first dwell event associated with a particular one of the selectable regions outside the display screen, the particular selectable region intersected by a plurality of the successive locations, for selecting the menu option associated with the particular selectable region.

20 2 - 18. (canceled)

19. (currently amended) In a human interface system including a display whereon a first cursor may be displayed and moved responsive to successive locations indicated by a movement related signal, an apparatus for selecting a menu option associated with an overshoot selectable region on the display, said apparatus comprising:

- 25 (a) display means for displaying a plurality of selectable regions within a first polygon intersecting the display, each selectable region associated respectively with a menu option, each selectable region adjacent a side of the first polygon and the plurality of selectable regions together at least partially circumscribing a region on the display;
- 30 (b) movement related signal receiving means for receiving the movement related signal

indicating the successive locations; and

(c) control means for:

- (1) moving the first cursor within the first polygon responsive to the successive locations indicated by the movement related signal;
- (2) confining at least part of the first cursor to the first polygon; and
- (3) in response to a first quantity equalling or exceeding a predetermined quantity, the first quantity being a function of the durations of one or more successive periods of intersection of the first cursor and one of the selectable regions, selecting the menu option associated with the intersected selectable region.

20. (original) The apparatus of claim 19 wherein the first polygon is located on the display.

21. (original) The apparatus of claim 20 wherein at least one of the selectable regions intersects the at least partially circumscribed region.

22. (original) The apparatus of claim 20 wherein the control means is further operative to confine at least part of the first cursor to a second polygon on the display.

23. (original) The apparatus of claim 22 wherein the control means is further operative to switch, responsive to an intersection of the first cursor and one of the selectable regions, from confining at least part of the first cursor to the first polygon to confining at least part of the first cursor to the second polygon.

24. (previously presented) The apparatus of claim 22 wherein the control means is further operative to switch, responsive to a distance between two of the successive locations, from confining at least part of the first cursor to the first polygon to confining at least part of the first cursor to the second polygon.

25. (original) The apparatus of claim 22 wherein the control means is further operative to switch, responsive to an angle indicated by three of the successive locations, from confining at least

part of the first cursor to the first polygon to confining at least part of the first cursor to the second polygon.

26. (original) The apparatus of claim 22 wherein the first polygon intersects the second polygon.
27. (original) The apparatus of claim 26 wherein the first polygon includes all of the area of the second polygon.
28. (currently amended) The apparatus of claim 20 wherein the selection of the control means is further responsive to ~~the proximity of one of the successive locations indicated by the movement related signal to~~ a distance between one of the successive locations and the location of the first cursor.
29. (currently amended) The apparatus of claim 20 wherein the selection of the control means is further responsive to ~~the proximity of one of the successive locations indicated by the movement related signal to~~ a distance between one of the successive locations outside the intersected selectable region and the intersected selectable region.
30. (original) The apparatus of claim 20 wherein the first polygon has at least five sides.
31. (currently amended) The apparatus of claim 20 wherein ~~at least one of the plurality of selectable regions is associated with an icon on the display~~ the display means is further operative to display on the display a sequence of one or more graphic symbols representing the menu option associated with the intersected selectable region.
32. (currently amended) The apparatus of claim 31 wherein the icon sequence of one or more graphic symbols represents any one of: ~~a sign of a manual sign language, a location relative to a human body, a topic of conversation, a sentence, a desired direction of movement of a second cursor on the display, a sequence of one or more graphics including an ideograph, and a symbol of a symbol set~~

- (a) a letter of an alphabet;
- (b) a word;
- (c) a prefix;
- (d) an infix;
- (e) a suffix;
- (f) a kana;
- (g) a sequence of one or more graphic symbols including an ideograph;
- (h) a phoneme;
- (i) a sign of a sign language;
- (j) a topic of conversation;
- (k) a sentence;
- (l) a location;
- (m) a direction;
- (n) a desired direction of movement of a second cursor on the display; and
- (o) a symbol of a symbol set including but not limited to any one of the Picture Communication Symbols symbol set, the Rebus symbol set, the Picsyms symbol set, the Pictogram Ideogram Communication Symbols symbol set, the Yerkish symbol set, the Minspeak symbol set, and the Blissymbolics symbol set.

33. (currently amended) An apparatus for selecting a submenu option from a menu hierarchy, said apparatus comprising:
- (a) a display area;
 - (b) a menu comprising a plurality of menu options, ~~at least~~ a specific one of the menu options associated with a submenu comprising a plurality of submenu options;
 - (c) means for at least partially delimiting:
 - (1) a plurality of first selectable regions, each of the first selectable regions associated respectively with one of the menu options and each of the first selectable regions including a first subregion adjacent the display area and a first subregion on the display area, the plurality of the first subregions on the display area together at least partially circumscribing a first region on the display area; and

- 5 (2) a plurality of second selectable regions, each of the second selectable regions associated respectively with one of the submenu options and each of the second selectable regions including a second subregion adjacent the display area and a second subregion on the display area, the plurality of the second subregions on the display area together at least partially circumscribing a second region on the display area;
- (d) movement related signal receiving means for receiving a movement related signal indicating successive locations with respect to the display area; and
- 10 (e) selection means for selecting, ~~in response to a first dwell event, the menu option associated with the first selectable region intersected by one of the successive locations indicated by the movement related signal, the menu option being one of the menu options associated with a submenu~~ the specific menu option in response to a first dwell event triggered by a specific one of the successive locations intersecting the first selectable region associated with the specific menu option, and for selecting, ~~in response to a second dwell event, the submenu option associated with the second selectable region intersected by one of the successive locations indicated by the movement related signal~~ a particular one of the submenu options in response to a second dwell event triggered by a particular one of the successive locations intersecting the second selectable region associated with the particular submenu option.
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20 34. (currently amended) The apparatus of claim 33 wherein ~~one of the menu options~~ the specific menu option represents a group of characters and wherein ~~a first one of the submenu options~~ the particular submenu option represents a first one character of the group of characters.

- 25 35. (currently amended) The apparatus of claim 34 wherein each character of the group of characters has any one of:
- (a) an extension at least a predetermined distance above the baseline of the group of characters;
- (b) an extension below the baseline of the group of characters;
- 30 (c) lack of the characteristic described in (a); and

(d) lack of the characteristic described in (b).

36. (original) The apparatus of claim 34 wherein the distance on the display area between the first subregion on the display area associated with the menu option representing the group of characters and the second subregion on the display area associated with the submenu option representing the first one character of the group of characters is responsive to the frequency of use of the first one character.

37. (original) The apparatus of claim 34 wherein:

- (a) a second one of the submenu options represents a second one character of the group of characters;
- (b) the first one character is more frequently used than the second one character; and
- (c) the distance on the display area between the first subregion on the display area associated with the menu option representing the group of characters and the second subregion associated with the submenu option representing the first one character of the group of characters is less than the distance on the display area between the first subregion on the display area associated with the menu option representing the group of characters and the second subregion on the display area associated with the submenu option representing the second one character of the group of characters.

38. (original) The apparatus of claim 34 wherein the position of a character of the group of characters indicates the position of the second subregion on the display area associated with the submenu option representing the first one character of the group of characters.

39. (currently amended) An apparatus for selecting a menu option from a plurality of menu options, said apparatus comprising:

- (a) a display area;
- (b) delimit means for at least partially delimiting a plurality of selectable regions, each of the selectable regions outside the display area and each associated respectively with a menu option;

- (c) movement related signal receiving means for receiving a movement related signal indicating a first location with respect to the display area, the first location intersecting a particular one of the selectable regions;
- (d) a plurality of indicators, each associated respectively with one of the selectable regions, for indicating which one of the selectable regions is intersected by the location; and
- (e) selection means for selecting, in response to a first selection event associated with the intersection of the first location and the particular selectable region intersected by the location, the menu option associated with the intersected particular selectable region.

40. (currently amended) The apparatus of claim 39 wherein the selection means is further capable of receiving a signal indicating a switch operation; and wherein the first selection event includes a the switch operation at or near the time the intersection occurs.

41. (currently amended) The apparatus of claim 39 further comprising means for indicating the menu option associated with each selectable region.

42. (canceled)

43. (original) The apparatus of claim 39 further comprising location indication means for indicating the location of each selectable region.

44. (original) The apparatus of claim 43 wherein the location indication means further comprises means for displaying each menu option on the display area, wherein the location of each displayed menu option indicates the location of the associated selectable region.

45 (currently amended) The apparatus of claim ~~39~~ 43 ~~where the location indication means includes means for displaying at least part of each selectable region on the display area~~ wherein the movement related signal is further capable of indicating a second location with respect to the display area; and wherein the selection means for selecting the menu option is further responsive to a first quantity equalling or exceeding a first predetermined quantity, the first

quantity being a function of a duration of a first period of intersection, the first period starting in response to the second location intersecting the particular selectable region and ending in response to the first location intersecting the particular selectable region.

5 46. (previously presented) The apparatus of claim 39 wherein the first selection event includes a switch operation; and wherein the selection means further comprises switch operation receiving means for receiving a signal indicating the switch operation.

10 47. (currently amended) The apparatus of claim 39 wherein the selection means is at least partially disabled in response to a second selection event while maintaining a power supply to the apparatus.

15 48. (previously presented) The apparatus of claim 47 wherein the selection means, in response to a third selection event, is restored to the functionality it had prior to the second selection event.

49. (currently amended) The apparatus of claim 39 wherein ~~all or all but one of the selectable regions are partially delimited~~ the particular selectable region is any one of:

- (a) completely visible;
- (b) partially visible and partially invisible;
- 20 (c) completely invisible;
- (d) completely delimited;
- (e) partially delimited;
- (f) adjacent an edge of the display screen;
- (g) not adjacent an edge of the display screen;
- 25 (h) adjacent another of the selectable regions; and
- (i) not adjacent another of the selectable regions.

50. (original) The apparatus of claim 49 wherein one of the selectable regions is completely delimited.

51. (currently amended) The apparatus of claim ~~49~~ 39 further comprising a computer system including display means for displaying at least part of the output of an application program executable on the computer system ~~in the region on the display area and;~~ wherein ~~at least one of the menu options~~ the particular menu option represents an input to the application program; and wherein the selection means is further operative, responsive to the selection of the particular menu option, to provide the input to the application program.

52. (currently amended) An apparatus for selecting a menu option from a plurality of menu options, said apparatus comprising:

- 10 (a) a surface;
- (b) means for delimiting a plurality of selectable regions on the surface, each of the selectable regions associated respectively with ~~a menu option~~ one of the menu options, the plurality of selectable regions together at least partially circumscribing a region on the surface;
- 15 (c) a pointer, responsive to the movement of a one of an operator's limbs, digits and head, for indicating successive locations on the surface; and
- (d) selection means for selecting, in response to a dwell event, the menu option associated with the selectable region intersected by one of the successive locations indicated by the pointer.

- 20 53. (previously presented) An apparatus for selecting a menu option from a plurality of menu options, said apparatus comprising:

- (a) means for displaying a plurality of selectable regions on a display area, each of the selectable regions associated respectively with a menu option, the plurality of selectable regions together at least partially circumscribing a region on the display area;
- 25 (b) movement related signal receiving means for receiving a movement related signal indicating successive locations with respect to the display area; and
- (c) in response a quantity equalling or exceeding a predetermined quantity, the quantity being a function of the durations of a plurality of successive periods of intersection of two or more of the successive locations and one of the selectable regions, selection means for
- 30 selecting the menu option associated with the intersected selectable region.

54. (original) An apparatus for selecting an option from a menu, said apparatus comprising:
- (a) cursor movement means for receiving a movement related signal and for moving a cursor on a display responsive to the received movement related signal;
 - (b) delimit means for delimiting on the display a first plurality of regions and a second plurality of selectable regions, each of the second plurality of selectable regions associated respectively with a menu option; the first plurality of regions together at least partially circumscribing a first region on the display; and
 - (c) selection means, responsive only to an intersection of the cursor and a first one of the first plurality of regions and thereafter to a first selection event associated with one of the second plurality of selectable regions, for selecting the menu option associated with the selectable region associated with the first selection event.
55. (original) The apparatus of claim 54 further comprising means for receiving a switch operation signal; and wherein the delimit means includes means for displaying the first plurality of regions responsive to the received switch operation signal.
56. (original) The apparatus of claim 54 wherein the second plurality of selectable regions together at least partially circumscribing the first region on the display.
57. (original) The apparatus of claim 54 further comprising a third plurality of selectable regions, each of the third plurality of selectable regions associated respectively with a menu option; and wherein the selection means is further responsive to an intersection of the cursor and a second one of the first plurality of regions and thereafter to a second selection event associated with one of the third plurality of selectable regions, for selecting the menu option associated with the selectable region associated with the second selection event.
58. (original) The apparatus of claim 54 wherein the selection means includes means for receiving a switch operation signal; and wherein the first selection event includes:
- (1) an intersection of the cursor and the selectable region associated with the second selection

event; and

(2) at or near the time the intersection occurs, receipt of the switch operation signal.

59. (canceled)

60. (canceled)

61. (original) In a human interface system wherein a body member of an operator may indicate a location on a surface, a menu option selector comprising:

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- (a) the surface including a display area, the display area having thereon a plurality of selectable regions, each of the selectable regions associated respectively with a menu option, the plurality of selectable regions together at least partially circumscribing a region on the display area;
- (b) a clipper for generating, in response to the location indicated by the body member of the operator indicating a location outside the display area, a clipped location indicative of a location on the display area; and
- (c) a selector for selecting, in response to a selection event, the menu option associated with the selectable region intersected by the clipped location.
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20 62. (original) The menu option selector of claim 61 wherein each of the plurality of selectable regions is adjacent an edge of the display area.

63. (original) In a human interface system wherein a body member of an operator may indicate a location on a surface, a menu option selector comprising:

- 25 (a) the surface including a display area, the display area having thereon a plurality of selectable regions, each of the selectable regions associated respectively with a menu option, the plurality of selectable regions together at least partially circumscribing a region on the display area;
- (b) a confiner for confining the location indicated by the body member of the operator to the display area; and
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- (c) a selector for selecting, in response to a selection event, the menu option associated with the selectable region intersected by the location indicated by the body member of the operator.

5 64. (original) The menu option selector of claim 63 wherein each of the plurality of selectable regions is adjacent an edge of the display area.

65. (previously presented) In a human interface system wherein a body member of an operator may indicate successive locations on a surface, a menu option selector comprising:

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- (a) a detector area on the surface, the detector area including a plurality of selectable regions, each of the selectable regions associated respectively with a menu option, the plurality of selectable regions together at least partially circumscribing a region on the surface;
 - (b) a confiner for confining the location indicated by the body member of the operator to the detector area; and
 - (c) a selector for selecting, in response to a dwell event associated with any one of the selectable regions, the menu option associated with the selectable region associated with the dwell event.
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20 66. (original) The menu option selector of claim 65 wherein each of the plurality of selectable regions is adjacent an edge of the detector area.

67. (previously presented) An apparatus for selecting an option from a menu, said apparatus comprising:

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- (a) a display area;
 - (b) means for displaying a plurality of menu options, the display of the plurality of menu options together at least partially circumscribing a region on the display area, each menu option associated respectively with a position of a user activatable switch outside the display area, the switch being positionable with respect to the location of each menu option for selection thereof; and
 - (c) a selector for selecting a particular one of the menu options in response to a first position
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of the switch corresponding to the particular menu option for a period equalling or exceeding a first predetermined time period.

5 68. (original) The apparatus of claim 67 wherein the display means is further operative to indicate the selected menu option.

10 69. (previously presented) The apparatus of claim 67 further comprising a plurality of submenu options associated with the particular menu option, each of the submenu options associated respectively with a position of the switch; and wherein the display means is further operative, responsive to the selection of the particular menu option, to display the plurality of submenu options, the display of the plurality of submenu options together at least partially circumscribing the region on the display area; and wherein the selector, in response to a second position of the switch corresponding to a specific one of the submenu options for a period equalling or exceeding a second predetermined time period, is further operative to select the specific submenu option.

15 70. (original) For use with a general purpose computer system including a display on which a cursor may be displayed, the general purpose computer system being capable of executing an application program, an apparatus comprising:

- 20 (a) a medium readable by the general purpose computer system; and
- (b) a program, stored on the medium and executable by the general purpose computer system, for:
- 25 (1) displaying a plurality of selectable regions within a polygon on the display, each selectable region adjacent a side of the polygon, one or more of the selectable regions each associated respectively with a sequence of one or more characters, the plurality of selectable regions together at least partially circumscribing a region on the display;
- (2) receiving a movement related signal and moving at least part of the cursor only within the polygon responsive to the movement related signal; and
- 30 (3) in response to a first quantity equalling or exceeding a predetermined quantity, the

first quantity being a function of the durations of one or more successive periods of intersection of the cursor and one of the one or more selectable regions, inputting the sequence of one or more characters associated with the intersected selectable region to the application program.

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71. (original) A data entry system including a computer system on which may be executed an application program, said data entry comprising:

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- (a) the computer system including a display;
- (b) a pointer selected from the group consisting of a (1) mouse; (2) trackball; (3) joystick; (4) stylus and graphics tablet; (5) lightpen; (6) thumb wheel; (7) touch screen; (8) head pointer; and (9) intraoral pointer, the pointer coupled to the computer system; and
- (c) program means executable on the computer system for:
- (1) displaying a plurality of selectable regions within a polygon on the display, each selectable region adjacent a side of the polygon, the plurality of selectable regions together at least partially circumscribing a region on the display;
- (2) moving a cursor within the polygon responsive to movement of the pointer; and
- (3) in response to a selection event and an intersection of the cursor and a selectable region associated with an input for the application program, inputting the input to the application program.
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72. (original) A computer access system for an operator having impaired motor capability, said computer access system including a computer system on which may be executed a computer program, said computer access system comprising:

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- (a) the computer system including a display;
- (b) program means executable on the computer system for:
- (1) displaying a plurality of selectable regions within a polygon on the display, each selectable region adjacent a side of the polygon, the plurality of selectable regions together at least partially circumscribing a region on the display;
- (2) receiving a movement related signal and moving at least part of a cursor only within the polygon responsive to the movement related signal; and
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- (3) in response to a selection event and an intersection of the cursor and a selectable region associated with an input for the computer program, inputting the input to the computer program.

5 73. (previously presented) A voice output system for a user having impaired speech comprising:

- (a) a display on which may be displayed a plurality of selectable regions within a polygon on the display, each selectable region adjacent a side of the polygon and one or more of the selectable regions associated respectively with and displaying on the display a sequence of one or more letters, the plurality of selectable regions together at least partially circumscribing a region on the display;
- 10 (b) a voice output device; and
- (c) control means for:
- (1) receiving a movement related signal and moving a cursor within the polygon responsive to the movement related signal;
- (2) in response to a succession of selection events, each associated respectively with an intersection of the cursor and one of the selectable regions associated with one of the one or more sequences of one or more letters, appending the sequence associated with the intersected selectable region to at least one previously selected sequence; and
- 20 (3) speaking, by means of the voice output device, the word spelled by the appended sequences.

74. (original) A device controller comprising:

- (a) means for displaying a plurality of selectable regions within a polygon on a surface, each selectable region adjacent a side of the polygon and each selectable region associated respectively with a device control function, the plurality of selectable regions together at least partially circumscribing a region of the polygon;
- 25 (b) signal generating means coupled to a device for generating a device control signal; and
- (c) control means for:
- 30 (1) receiving a movement related signal and moving at least part of a cursor only within

the polygon in response to the received movement related signal; and

- (2) in response to a selection event, generating a device control signal corresponding to the device control function associated with the one of the plurality of selectable regions intersected by the cursor.

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75. (original) The device controller of claim 74 wherein the device includes any one of a wheelchair, a household appliance, an appliance for use in an office, a workstation, a robot, and a computer peripheral.

- 10 76. (original) An apparatus for editing a document, said apparatus comprising:

means for selecting a first sequence of one or more graphic symbols from a plurality of sequences of one or more graphic symbols, at least part of each of the plurality of sequences having a common attribute for optical recognition purposes;

means for inputting the first sequence into the document;

means for delimiting on a display a plurality of selectable regions, the plurality of selectable regions together at least partially circumscribing a region on the display, at least two of the selectable regions associated respectively with a sequence of the plurality of sequences;

means for displaying on the display the at least two sequences of the plurality of sequences associated with the at least two selectable regions;

means for receiving a movement related signal and moving a cursor on the display responsive thereto; and

in response to a selection event wherein the cursor at or near the time the selection event occurs intersects any one of the at least two selectable regions, means for inputting the sequence associated with the intersected selectable region into the document.

77. (original) The apparatus of claim 76 further comprising means, responsive to the selection event, for deleting the first sequence from the document.

5 78. (original) For use with a surface comprising a display area, a method of selecting a menu option from a plurality of menu options, said method comprising the steps of:

10 at least partially delimiting a plurality of selectable regions, each of the selectable regions associated respectively with a menu option and each of the selectable regions including an invisible subregion outside the display area and a visible subregion on the display area, the plurality of visible subregions together at least partially circumscribing a region on the display area;

15 receiving a movement related signal indicating successive locations with respect to the display area; and

selecting, in response to a dwell event associated with one of the selectable regions, the menu option associated with the selectable region associated with the dwell event.

20 79. (original) For use with a human interface system wherein a body member of an operator may indicate successive locations on a surface, the surface including a display area, the display area having thereon a plurality of selectable regions, each of the selectable regions associated respectively with a menu option and the plurality of selectable regions together at least partially circumscribing a region on the display area, a method of selecting a menu option from a plurality
25 of menu options, said method comprising the steps of:

confining each of the successive locations to the display area; and

30 selecting, in response to a dwell event associated with one of the selectable regions, the menu option associated with the selectable region associated with the dwell event.

80. (previously presented) A method of speaking using a voice output system including a display and a voice output device, said method comprising the steps of:

5 displaying a plurality of selectable regions within a polygon on the display, each selectable region adjacent a side of the polygon and one or more of the selectable regions associated respectively with a sequence of one or more characters, the plurality of selectable regions together at least partially circumscribing a region on the display;

10 receiving a movement related signal and moving at least part of a cursor only within the polygon responsive to the movement related signal;

repetitively:

15 (i) in response to a first quantity equalling or exceeding a predetermined quantity, the first quantity being a function of the durations of one or more successive periods of intersection of the cursor and one of the one or more selectable regions, selecting the sequence associated with the intersected selectable region; and

20 (ii) appending the selected sequence to at least one previously selected sequence; and

speaking, by means of the voice output device, the word spelled by the appended sequences.

25 81. (canceled)

82. (previously presented) The apparatus of claim 22 further comprising sensor signal receiving means for receiving a sensor signal indicative of an actual or attempted muscle activation; and wherein the control means is further operative to switch, responsive to the sensor signal, from
30 confining at least part of the first cursor to the first polygon to confining at least part of the first

cursor to the second polygon.

83. (previously presented) The apparatus of claim 82 wherein the human interface system includes a switch and the sensor signal indicates an operation of the switch.

84. (previously presented) The apparatus of claim 22 wherein all of the area of the second polygon lies within the first polygon.

85. (previously presented) An apparatus for selecting a menu option from a plurality of pluralities of menu options, said apparatus comprising:

- (a) a surface;
- (b) means for delimiting a plurality of selectable regions on the surface, the plurality of selectable regions together at least partially circumscribing a region on the surface;
- (c) a pointer, responsive to the movement of a body member of a user, for indicating successive locations on the surface;
- (d) sensor signal receiving means for receiving a sensor signal; and
- (e) selection means
 - (1) responsive to the sensor signal, for associating each of the selectable regions respectively with the menu options of one of the plurality of menu options, and
 - (2) responsive to a quantity equalling or exceeding a predetermined quantity, the quantity being a function of the durations of one or more successive periods of intersection of two or more of the successive locations and a particular selectable region, for selecting the menu option associated with the particular selectable region.

86. (previously presented) The apparatus of claim 85 further comprising indicating means for indicating which plurality of menu options is associated with the selectable regions.

87. (previously presented) The apparatus of claim 85 wherein the selection means is further responsive to the sensor signal equalling or exceeding a predetermined signal level.

88. (previously presented) The apparatus of claim 87 wherein the selection means is further responsive to the sensor signal equalling or exceeding the predetermined signal level for a predetermined period.
- 5 89. (previously presented) In a human interface system wherein a body member of an operator may indicate a location on a surface, a menu option selector comprising:
- (a) the surface including a display area, the display area having thereon a plurality of pluralities of selectable regions, each of the pluralities of selectable regions at least partially circumscribing a region on the display area;
 - 10 (b) a sensor for sensing an actual or attempted muscle activation of the operator and, responsive thereto, for associating each selectable region of one of the pluralities of selectable regions respectively with a menu option;
 - (c) a clipper for generating, in response to the location indicated by the body member of the operator indicating a location outside the display area, a clipped location indicative of a location on the display area; and
 - 15 (d) a selector for selecting, in response to a selection event, the menu option associated with the selectable region intersected by the clipped location.
- 90 - 93. (canceled)
- 20 94. (previously presented) A voice output system for a user having impaired motor control, said voice output system comprising:
- (a) a display screen;
 - (b) a delimit device completely delimiting an invisible selectable region outside the display screen associated with a sequence of one or more words;
 - 25 (c) a voice output device;
 - (d) a movement related signal receiver for receiving a movement related signal indicating successive locations with respect to the display screen; and
 - (d) a selection device, responsive to a quantity equalling or exceeding a predetermined
 - 30 quantity, the quantity being a function of the durations of one or more successive periods

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of intersection of two or more of the successive locations and the selectable region outside the display screen, for selecting the selectable region;
whereby the user may select the selectable region outside the display and speak, with the voice output device, the sequence of one or more words.

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95 - 100. (canceled)

101. (previously presented) The apparatus of claim 86 wherein the selected menu option represents a sequence of one or more words; and further comprising a voice output device for speaking the sequence of one or more words responsive to the selection means selecting the selected menu option.

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102. (previously presented) The apparatus of claim 86 further comprising a plurality of selectable regions outside the surface, each associated respectively with one of the selectable regions on the surface; and wherein the first dwell event includes a first quantity equalling or exceeding a predetermined quantity, the first quantity being a function of:

- (a) the durations of one or more successive periods of intersection of two or more of the successive locations and one of the selectable regions on the surface; and
- (b) the durations of one or more successive periods of intersection of two or more of the successive locations and the selectable region outside the surface associated with the intersected selectable region on the surface.

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103. (previously presented) The apparatus of claim 86 further comprising signal generating means coupled to a device for generating a device control signal corresponding to a device control function; wherein the selected menu option represents the device control function; and wherein the signal generating means, in response to the dwell event, generates the device control signal represented by the selected menu option.

25

104. (previously presented) The apparatus of claim 73 wherein the movement related signal is responsive to the head movement of the user; wherein each of the plurality of selectable regions

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is adjacent an edge of the display; wherein each of the succession of selection events includes a plurality of periods of intersection of the cursor and the intersected selectable region, each plurality of periods of intersection having a total duration equalling or exceeding a predetermined period; and wherein the control means further includes means for indicating the difference between the predetermined period and the total duration of the plurality of periods.

105. (previously presented) The apparatus of claim 85 wherein the sensor signal is responsive to a sound.

106. (previously presented) In voice output system for a user having impaired motor capability, an apparatus for selecting a menu option associated with an overshoot selectable subregion on a display screen, said apparatus comprising:

- (a) a voice output device;
- (b) the display screen;
- (c) a menu comprising a plurality of menu options, each associated respectively with a sequence of one or more letters; and
- (d) control means for:
 - (1) delimiting a plurality of selectable regions, each of the selectable regions associated respectively with one of the plurality of menu options, and each of the selectable regions including a subregion outside and adjacent the display screen and a subregion on the display screen, the subregion outside and adjacent the display screen and the subregion on the display screen adjacent one another, the plurality of the subregions on the display screen together at least partially circumscribing a region on the display screen;
 - (2) receiving a movement related signal indicating successive locations with respect to the display screen;
 - (3) in response to a succession of dwell events, each including an intersection of a first one and a second one of the successive locations and one of the subregions outside and adjacent the display screen, selecting the sequence of one or more letters associated with each of the intersected subregions, and appending the selected

sequence to at least one previously selected sequence; and

- (4) speaking, by means of the voice output device, the word spelled by the appended sequences.

5 107. (canceled)

108. (previously presented) The apparatus of claim 1 wherein at least one of the selectable regions is completely delimited.

10 109 - 111. (canceled)

112. (previously presented) The apparatus of claim 73 wherein the control means moves the cursor only with the polygon.

15 113. (previously presented) The apparatus of claim 106 wherein each of the succession of dwell events includes a first quantity equalling or exceeding a predetermined quantity, the first quantity being a function of the difference in time between the occurrence of the second successive location and the first successive location.

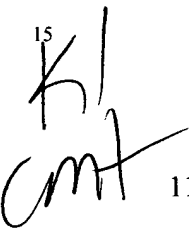
20 114. (previously presented) A voice output system comprising:

- (a) a display screen including a working region with a periphery;
- (b) a movement related signal receiver for receiving a movement related signal indicating a location with respect to the display screen responsive to user movement by a user, the user movement indicating a potential user selection;
- 25 (c) a delimit device for delimiting selectable regions adjacent the periphery of the working region, each of the selectable regions selectable by the user and having an external boundary wherein the external boundary includes the side of the selectable region furthest from the working region and having either a confiner for preventing the movement related signal indicating the location from moving beyond the external boundary of the selectable region or having an activation area extending beyond the external boundary of the
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selectable region and beyond the display screen, each of the selectable regions associated respectively with and simultaneously displaying a first sequence of one or more characters, a first sequence of one or more words, or a first sequence of one or more symbols representing the first sequence of one or more words; and

- 5 (d) a voice output device for speaking the first sequence of one or more characters and/or words associated with a first particular selectable region responsive to a first intersection of the movement related signal and the first particular selectable region or the activation area associated therewith, thereby providing the user with the ability to select the first particular selectable region while overshooting the first particular selectable region or by
- 10 providing a confiner to the first particular selectable region for the movement related signal.

115. (previously presented) The voice output system of claim 114 wherein the voice output device is further responsive to a period of the intersection of the movement related signal and the first particular selectable region or the activation area associated therewith, the period of intersection equalling or exceeding a predetermined period.

15  116. (previously presented) The voice output system of claim 115 wherein the voice output device is only responsive to the period of the intersection of the movement related signal and the first particular selectable region or the activation area associated therewith equalling or exceeding the

20 predetermined period for speaking the first sequence of one or more characters and/or words associated with the first particular selectable region.

117. (previously presented) The voice output system of claim 115 wherein the predetermined period

25 equals or exceeds two hundred milliseconds.

118. (previously presented) The voice output system of claim 114 wherein none of the selectable regions is adjacent another of the selectable regions.

30 119. (previously presented) The voice output system of claim 114 wherein the delimit device is

further operative to delimit a second selectable region outside the working region and adjacent one of the first selectable regions, the second selectable region selectable by the user and having an external boundary wherein the external boundary includes the side of the second selectable region furthest from the working region, the second selectable region having a confiner for preventing the movement related signal indicating the location from moving beyond the external boundary of the second selectable region or having an activation area extending beyond the external boundary of the second selectable region, the second selectable region associated with a second sequence of one or more characters, a second sequence of one or more words, or a second sequence of one or more symbols representing the second sequence of one or more words.

120. (previously presented) The voice output system of claim 114 wherein a particular confiner of at least one of the selectable regions is further operative to confine the movement related signal within a particular side of the selectable region other than the external boundary.

121. (previously presented) The voice output system of claim 120 wherein the particular confiner, responsive to any one of:

- (a) a path of the movement related signal;
 - (b) a change of direction of the movement related signal;
 - (c) a velocity of the movement related signal;
 - (d) an acceleration or deceleration of the movement related signal; and
 - (e) a change in the acceleration or deceleration of the movement related signal;
- may allow the movement related signal to pass through the particular side of the selectable region.

122. (previously presented) The voice output system of claim 114 wherein a first cursor is displayed on the display screen at or near the location indicated by the movement related signal and a second cursor differing in appearance from the first cursor is displayed on the display screen responsive to the location indicated by the movement related signal intersecting or nearly intersecting the external boundary of the particular of the selectable region.

123. (previously presented) The voice output system of claim 114 wherein the voice output device is further responsive to an intersection of the movement related signal and one of the selectable regions for repeating the previously spoken first sequence of one or more words.

5 124. (previously presented) The voice output system of claim 123 wherein the repeated sequence of one or more words is spoken either more loudly or more slowly than the previously spoken sequence.

10 125. (previously presented) The voice output system of claim 114 wherein the previously selected first sequence may be deleted prior to being spoken by the voice output device, the deletion being responsive to an intersection of the movement related signal and one of the selectable regions..

15 126. (previously presented) The voice output system of claim 114 wherein each of the selectable regions is located outside the display screen.

20 127. (previously presented) The voice output system of claim 126 further comprising indicators on the display screen, each indicator associated respectively with one of the selectable regions and indicating the location of the associated selectable region.

128. (previously presented) The voice output system of claim 127 wherein the first particular indicator associated with the first particular selectable region may indicate the intersection of the movement related signal and the first particular selectable region.

25 129. (previously presented) The voice output system of claim 114 wherein the voice output device is at least partially disabled in response to an intersection of the movement related signal and one of the selectable regions or the activation area associated therewith.

30 130. (previously presented) The voice output system of claim 129 wherein the voice output device, in response to an intersection of the movement related signal and one of the selectable regions or

the activation area associated therewith, is restored to the functionality it had prior to the at least partial disabling of the voice output device.

5 131. (previously presented) The voice output system of claim 114 further comprising a computer system capable of executing an application program which may display at least part of its output in the working region; and wherein at least one of the first sequence of characters, words, or symbols represents an input to the application program.

10 132. (previously presented) The voice output system of claim 131 further comprising a pointer selected from the group consisting of a (1) mouse; (2) trackball; (3) joystick; (4) stylus and graphics tablet; (5) lightpen; (6) thumb wheel; (7) touch screen; (8) head pointer; (9) intraoral pointer; and (10) eye tracker, the pointer coupled to the computer system; and wherein the movement related signal is responsive the pointer and the pointer is responsive to the user movement.

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cont

15 133. (previously presented) The voice output system of claim 114 wherein the user movement is the movement of a body member of the user including any one of:

- (a) the head of the user;
- (b) an eye of the user;
- 20 (c) a shoulder of the user;
- (d) an arm of the user;
- (e) an elbow of the user;
- (f) a wrist of the user;
- (g) a hand of the user;
- 25 (h) a finger of the user;
- (i) a thumb of the user;
- (j) a knee of the user;
- (k) a leg of the user;
- (l) a foot of the user;
- 30 (m) a toe of the user;

- (n) an ankle of the user; and
- (o) the trunk of the user.

134. (previously presented) A voice output system comprising:

- (a) a surface including a selectable region selectable by a user and associated with a sequence of one or more characters, a sequence of one or more words, or a sequence of one or more symbols representing a sequence of one or more words;
- (b) movement related signal receiving means for receiving a movement related signal indicating a first location intersecting the selectable region and, at a later time, a second location intersecting the selectable region;
- (c) an indicator for indicating in a first manner at least the difference between the time the second location occurs and the time the first location occurs; and
- (d) a voice output device for speaking the sequence of one or more characters and/or words associated with the selectable region responsive to a first quantity that is a function of the difference equalling or exceeding a predetermined quantity.

135. (previously presented) The voice output system of claim 134 wherein the indication of the difference includes any one of:

- (a) a visible signal;
- (b) an audible signal; and
- (c) a tactile signal.

136. (previously presented) The voice output system of claim 134 wherein the indicator is further operative to indicate a second quantity which is a function of the difference between

- (a) a predetermined period; and
- (b) the difference between the time the second location occurs and the time the first location occurs.

137. (previously presented) The voice output system of claim 134 wherein the movement related signal further indicates, at a time later than the time the second location occurs, a third location

not intersecting the selectable region and the indicator is further operative to indicate the non-intersection of the third location and the selectable region.

5 138. (previously presented) The voice output system of claim 134 wherein the movement related signal further indicates, at a time later than the time the second location occurs, a third location not intersecting the selectable region and, at a later time, indicates a fourth location not intersecting the selectable region and the indicator is further operative to indicate at least the difference between the time the fourth location occurs and the time the third location occurs.

10 139. (previously presented) The voice output system of claim 138 wherein the indicator is further operative to produce an output signal which varies in at least one way as the difference between the time the second location occurs and the time the first location occurs increases and varies in at least the opposite way as the difference between the time the fourth location occurs and the time the third location occurs increases.

15 140. (previously presented) The voice output system of claim 134 wherein the indication in the first manner includes a modification in brightness.

20 141. (previously presented) The voice output system of claim 134 wherein the indicator is further operative to indicate in a second manner the first quantity equalling or exceeding the predetermined quantity.

25 142. (previously presented) The voice output system of claim 141 wherein the indication in the first manner includes a slight modification and the indication in the second manner includes a marked modification.

143. (previously presented) The voice output system of claim 141 wherein the indication in the second manner includes a modification in hue.

30 144. (previously presented) The voice output system of claim 134 wherein the indicator intersects the

selectable region.

145. (previously presented) The voice output system of claim 144 wherein the indicator and the selectable region are coterminous.

146. (previously presented) The voice output system of claim 134 further comprising a confiner for preventing the movement related signal indicating the first and second locations from moving beyond a side of the selectable region.

147. (previously presented) A voice output system comprising:

- (a) a display area including a working region with a periphery;
- (b) a movement related signal receiver for receiving a movement related signal indicating a location with respect to the display area responsive to user movement by a user, the user movement indicating a potential user selection;
- (c) a menu hierarchy including a menu comprising a plurality of menu options, a specific one of the menu options associated with a submenu comprising a plurality of submenu options, each of the submenu options associated respectively with a sequence of one or more characters, a sequence of one or more words, or a sequence of one or more symbols representing the sequence of one or more words;
- (d) a delimit device for delimiting a first and second plurality of selectable regions adjacent the periphery of the working region, each of the selectable regions selectable by the user and having an external boundary wherein the external boundary includes the side of the selectable region furthest from the working region and having either a confiner for preventing the movement related signal indicating the location from moving beyond the external boundary of the selectable region or having an activation area extending beyond the external boundary of the selectable region and beyond the display area, a specific one of the first plurality of selectable regions associated with the specific menu option and each of the second plurality of selectable regions associated respectively with and simultaneously displaying one of the submenu options; and
- (e) a voice output device for speaking the particular sequence of one or more characters and/or

words associated with a particular one of the second plurality of selectable regions responsive to a first intersection of the movement related signal and the specific selectable region or the activation area associated therewith and thereafter to a second intersection of the movement related signal and the particular selectable region or the activation area associated therewith, thereby providing the user with the ability to select each of the specific and the particular selectable regions while overshooting the specific or the particular selectable region or by providing a confiner to the specific or the particular selectable region for the movement related signal.

10 148. (previously presented) The voice output system of claim 147 wherein the specific menu option either includes at least part of the particular sequence, or represents a class of characters or words, the class including the particular sequence.

15 149. (previously presented) The voice output system of claim 148 wherein the class is any one of:


- (a) a class of characters having a common element in Morse code;
- (b) a part of speech;
- (c) a meaning;
- (d) a physical characteristic;
- (e) a functional characteristic;
- 20 (f) a direction;
- (g) a class of characters having an extension at least a predetermined distance above a baseline; and
- (h) a class of characters having an extension below a baseline.

25 150. (previously presented) The voice output system of claim 148 wherein, responsive to the selection of the specific selectable region, the individual characters, words, or symbols associated therewith are associated respectively with and simultaneously displayed by the second plurality of selectable regions for eventual selection by the user.

30 151. (previously presented) The voice output system of claim 148 wherein the distance on the display

area between the specific selectable region and each of at least two of the second plurality of selectable regions is responsive to a relative frequency of the use of the sequence of characters, words, or symbols associated with each of the at least two selectable regions.

5 152. (previously presented) The voice output system of claim 151 wherein the sequence of characters, words, or symbols associated with one of the at least two selectable regions is more frequently used than the sequence of characters, words, or symbols associated with another one of the at least two selectable regions; and the distance between the specific selectable region and the one of the at least two first selectable regions associated with the more frequently used sequence is
10 less than the distance between the specific selectable region and the another one of the at least two first selectable regions.

 153. (previously presented) The voice output system of claim 148 wherein the position of at least two characters, words, or symbols within the displayed specific sequence indicates the position of the one of the second plurality of selectable regions on the display area associated with the character, word, or symbol.

154. (previously presented) The voice output system of claim 147 wherein the particular sequence includes a sequence of one or more symbols, at least one symbol of the particular sequence representing any one of a letter of a sign alphabet, a sign of a sign language, a topic of
20 conversation, a sentence, a sequence of one or more graphics including an ideograph, and a symbol of a symbol set including but not limited to the Picture Communication Symbols symbol set, the Rebus symbol set, the Picsyms symbol set, the Pictogram Ideogram Communication Symbols symbol set, the Yerkish symbol set, the Blissymbolics symbol set, the Self-Talk symbol set, the Imaginart symbol set, the DynaSyms symbol set, the Oakland Picture Dictionary symbol set, the Talking Pictures symbol set, the Minspeak symbol set, the Unity symbol set, and the
25 Core Picture Vocabulary symbol set.

155. (previously presented) A voice output system comprising:
30 (a) a display area including a working region with a periphery;

- 5
- (b) a movement related signal receiver for receiving a movement related signal indicating a location with respect to the display area responsive to user movement by a user, the user movement indicating a potential user selection;
- (c) a delimit device for delimiting selectable regions adjacent the periphery of the working region, each of the selectable regions selectable by the user and having an external boundary wherein the external boundary includes the side of the selectable region furthest from the working region and having either a confiner for preventing the movement related signal indicating the location from moving beyond the external boundary of the selectable region or having an activation area extending beyond the external boundary of the selectable region and beyond the display area, each of the selectable regions associated respectively with and simultaneously displaying a sequence of one or more characters, a sequence of one or more words, or a sequence of one or more symbols representing the sequence of one or more words; and
- 10
- (d) a voice output device for speaking the sequence of one or more characters and/or words associated with a particular selectable region responsive to a quantity equalling or exceeding a predetermined quantity, the quantity being a function of the duration of a plurality of periods of intersection of the movement related signal and the particular selectable region or the activation area associated therewith,
- 15
- thereby providing the user with the ability to select the particular selectable region while overshooting the particular selectable region or by providing a confiner to the particular selectable region for the movement related signal.
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156. (previously presented) The voice output system of claim 155 wherein the quantity is further a function of the duration of a period of non-intersection of the movement related signal and the particular selectable region or the activation area associated therewith.

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157. (previously presented) The voice output system of claim 157 wherein the quantity varies one way as the duration of one of the periods of intersection increases and varies in an opposite way as the duration of the period of non-intersection increases.

158. (previously presented) An apparatus for selecting a menu option from a plurality of menu options, said apparatus comprising:

- (a) a display area including a working region with a periphery;
- (b) a movement related signal receiver for receiving a movement related signal indicating a location to be selected with respect to the display area responsive to a user selection by a user;
- (c) a delimit device for delimiting selectable regions adjacent the working region, each of the selectable regions having an external boundary wherein the external boundary is the side of the selectable region furthest from the working region, each of the selectable regions having a confiner for preventing the movement related signal indicating the location from moving beyond the external boundary of the selectable region or having an activation area extending beyond the external boundary of the selectable region, each of the selectable regions associated respectively with one of the menu options; and
- (d) a selection device for selecting the menu option associated with a particular one of the selectable regions responsive to an intersection of the movement related signal and the particular selectable region or the activation area associated therewith, thereby providing the user with the ability to select the particular selectable region while overshooting the particular selectable region with the movement related signal or by providing a confiner to the particular selectable region for the movement related signal.

159. (previously presented) A voice output system comprising:

- (a) a display area including a working region with a periphery;
- (b) a display device for displaying menu options on the display area, each menu option displayed adjacent the periphery of the working region, each menu option associated respectively with a position of a user activatable switch outside the display area, the switch being positionable with respect to the location of each menu option for selection thereof, each menu option associated respectively with a sequence of one or more characters, a sequence of one or more words, or a sequence of one or more symbols representing a sequence of one or more words, for selection via the switch; and
- (c) a voice output device for speaking the sequence of one or more characters or words

associated with a particular menu option, in response to the position of the switch corresponding to the particular menu option for a period equalling or exceeding a predetermined time period.

5 160. (previously presented) A voice output system comprising:

- 10 (a) a display area including a working region with a periphery;
- (b) a display device for displaying menu options on the display area, each menu option displayed adjacent the periphery of the working region, each menu option associated respectively with a position of a user activatable switch outside the display area, the switch being positionable with respect to the location of each menu option for selection thereof, each menu option associated respectively with a sequence of one or more characters, a sequence of one or more words, or a sequence of one or more symbols representing a sequence of one or more words, for selection via the switch; and
- 15 (c) a voice output device for speaking the sequence of one or more characters or words associated with a particular menu option, in response to the position of the switch corresponding to the particular menu option for a first time period equalling or exceeding a predetermined time period; and wherein the display device further includes an indicator for indicating at least the difference between the first time period and the predetermined time period.

20 161. (previously presented) A voice output system comprising:

- (a) a display area including a working region with a periphery;
- 25 (b) a menu hierarchy including a menu comprising a plurality of menu options, a specific one of the menu options associated with a submenu comprising a plurality of submenu options, each of the submenu options associated respectively with a sequence of one or more characters, a sequence of one or more words, or a sequence of one or more symbols representing the sequence of one or more words;
- 30 (c) a display device for displaying menu options and submenu options on the display area, each menu option displayed adjacent the periphery of the working region, each menu option associated respectively, and each submenu option associated respectively, with a

position of a user activatable switch outside the display area, the switch being positionable with respect to the location of each menu option or submenu option for selection thereof; and

- 5 (d) a voice output device for speaking the particular sequence of one or more characters or words associated with a particular one of the submenu options, in response to the position of the switch corresponding to the specific menu option for a first time period equalling or exceeding a first predetermined time period and thereafter to the position of the switch corresponding to the particular menu option for a second time period equalling or exceeding a second predetermined time period.

10 162. (previously presented) A voice output system comprising:

- 15 (a) a display area including a working region with a periphery;
- (b) a display device for displaying menu options on the display area, each menu option displayed adjacent the periphery of the working region, each menu option associated respectively with a position of a user activatable switch outside the display area, the switch being positionable with respect to the location of each menu option for selection thereof, each menu option associated respectively with a sequence of one or more characters, a sequence of one or more words, or a sequence of one or more symbols representing a sequence of one or more words, for selection via the switch; and
- 20 (c) a voice output device for speaking the particular sequence of one or more characters or words associated with a particular one of the menu options, in response a quantity equalling or exceeding a predetermined quantity, the quantity being a function of the duration of a plurality of periods in which the position of the switch corresponds to the particular menu option.

25 163. (previously presented) A method of speaking for an individual having impaired motor capability and impaired speech, said method comprising the steps of:

30 simultaneously displaying selectable regions adjacent a working region on a display, one or more of the selectable regions associated respectively with a sequence of one or more

characters, a sequence of one or more words, or a sequence of one or more symbols
representing a sequence of one or more words;

receiving a movement related signal indicating a location with respect to the display, the
movement related signal responsive to user movement indicating a potential user selection;

speaking the sequence of one or more characters or words associated with a particular
selectable region responsive to a period of intersection of the particular selectable region
and the location indicated by the movement related signal or the location on the display
closest thereto, the period equalling or exceeding a predetermined period, whereby the user
may make a selection although the user movement overshoots the particular selectable
region on the display.

164. select overshoot SR, complete and speak word; 1379.

164. (previously presented) In voice output system for a user having impaired motor capability, an
apparatus for spelling and speaking a word, said apparatus comprising:

- (a) a voice output device;
- (b) a plurality of sequences of one or more letters, which, when appended in a particular order,
spell a word;
- (c) a display on which may be displayed a plurality of selectable regions within a polygon on
the display, each selectable region adjacent a side of the polygon, the plurality of
selectable regions together at least partially circumscribing a region on the display, each of
the selectable regions associated respectively with and displaying on the display one of the
sequences of one or more letters; and
- (d) control means for:
 - (1) receiving a movement related signal and moving a cursor within the polygon
responsive to the movement related signal;
 - (2) in response to a first selection event associated with an intersection of the cursor and
one of the selectable regions, first selecting the sequence associated with the
intersected selectable region;

- (3) in response to a succession of selection events, each associated respectively with an intersection of the cursor and one of the selectable regions, successively appending the sequence of one or more letters associated with the intersected selectable region to the first selected sequence in the particular order; and
- (4) speaking, by means of the voice output device, the word.

165. (previously presented) An apparatus for voice output comprising:

- (a) a medium readable by a general purpose computer system including a voice output device and a display screen, the display screen including a working region with a periphery; and
- (b) a program, stored on the medium and executable by the general purpose computer system, for:
- (1) receiving a movement related signal indicating a location with respect to the display screen responsive to user movement by a user, the user movement indicating a potential user selection;
 - (2) delimiting selectable regions adjacent the periphery of the working region, each of the selectable regions selectable by the user and having an external boundary wherein the external boundary includes the side of the selectable region furthest from the working region;
 - (3) either preventing the movement related signal indicating the location from moving beyond the external boundary of the selectable region or delimiting an activation area extending beyond the external boundary of the selectable region and beyond the display screen, each of the selectable regions associated respectively with and capable of simultaneously displaying a first sequence of one or more characters, a first sequence of one or more words, or a first sequence of one or more symbols representing the first sequence of one or more words; and
 - (4) speaking with the voice output device the first sequence of one or more characters and/or words associated with a first particular selectable region responsive to a first intersection of the movement related signal and the first particular selectable region or the activation area associated therewith, thereby providing the user with the ability to select the first particular selectable region while overshooting the first

particular selectable region or by preventing the movement related signal from moving beyond the external boundary of the first particular selectable region.

5 166. (previously presented) An apparatus for selecting a menu option from a plurality of menu options, said apparatus comprising:

- (a) a medium readable by a general purpose computer system including a display screen, the display screen including a working region with a periphery; and
- (b) a program, stored on the medium and executable by the general purpose computer system, for:

- 10
- (1) at least partially delimiting a plurality of selectable regions, each of the selectable regions outside the display screen and each associated respectively with a displayed menu option;
 - (2) receiving a movement related signal indicating successive locations with respect to the display screen; and
 - (3) responsive to a first dwell event associated with a particular one of the selectable regions outside the display screen, the particular selectable region intersected by a plurality of the successive locations, selecting the menu option associated with the particular selectable region.
- 15

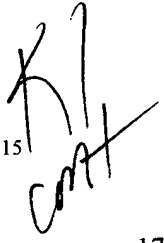
20 167. (previously presented) The apparatus of claim 147 wherein the delimit device is further operative to delimit a shared region on the display screen, and wherein one of the first selectable regions and one of the second selectable regions each includes the shared region.

25 168. (previously presented) The apparatus of claim 147 wherein the delimit device is further operative to delimit a plurality of shared regions, each shared region on the display screen and each associated respectively with one of the first plurality of selectable regions and with one of the second plurality of selectable regions; and wherein each of the first selectable regions and each of the second selectable regions includes the associated shared region.

30 169. (previously presented) The voice output system of claim 114 wherein the voice output device is

further responsive to a path of the user movement to the first particular selectable region or the activation area associated therewith.

5 170. (previously presented) An apparatus for selecting a menu option from a plurality of menu options, said apparatus comprising:

- (a) a display screen;
 - (b) a delimit device for at least partially delimiting a plurality of selectable regions, each of the selectable regions outside the display screen and each associated respectively with a displayed menu option;
 - 10 (c) a movement related signal receiver for receiving a movement related signal indicating successive locations with respect to the display screen; and
 - (d) a selection device, responsive to a first dwell event associated with a particular one of the selectable regions outside the display screen, the particular selectable region intersected by a plurality of the successive locations, for selecting the particular menu option associated with the particular selectable region.
- 

15 171. (previously presented) The apparatus of claim 170 further comprising a pointer, responsive to the movement of a body member of an operator, for generating the movement related signal, the body member of the operator including any one of:

- 20 (a) the head of the operator;
- (b) an eye of the operator;
- (c) a shoulder of the operator;
- (d) an arm of the operator;
- (e) an elbow of the operator;
- 25 (f) a wrist of the operator;
- (g) a hand of the operator;
- (h) a finger of the operator;
- (i) a thumb of the operator;
- (j) a knee of the operator;
- 30 (k) a leg of the operator;

- (l) a foot of the operator;
- (m) a toe of the operator;
- (n) an ankle of the operator; and
- (o) the trunk of the operator.

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172. (previously presented) The apparatus of claim 170 wherein the first dwell event includes a plurality of periods of intersection, each of two or more of the successive locations and the particular selectable region.

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173. (previously presented) The apparatus of claim 170 wherein the particular selectable region is not completely visible.



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174. (previously presented) The apparatus of claim 170 wherein at most one of the selectable regions is adjacent the display screen.

175. (previously presented) The apparatus of claim 170 wherein each of the successive locations is relative to a predetermined location on the display screen or to a previous location of the successive locations.

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176. (previously presented) The apparatus of claim 170 wherein the first dwell event includes a first quantity equalling or exceeding a predetermined quantity, the first quantity being a function of the durations of one or more successive periods of intersection of two or more of the successive locations and the particular selectable region.

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177. (previously presented) The apparatus of claim 170 wherein the first dwell event includes a first quantity equalling or exceeding a predetermined quantity, the first quantity being a function of a ratio between:

- (1) the durations of one or more successive periods of intersection of two or more of the successive locations and the particular selectable region; and
- (2) the durations of one or more successive periods of intersection of two or more of the

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successive locations and one of the selectable regions other than the particular selectable region.

5 178. (previously presented) The apparatus of claim 170 further comprising a plurality of selectable regions on the display screen, each associated respectively with one of the selectable regions outside the display screen; and wherein the selection device is further operative, responsive to a second dwell event associated with a certain one of the selectable regions on the display screen, the certain selectable region associated with the particular selectable region, to select the particular menu option.

10 179. (previously presented) The apparatus of claim 178 wherein each of one or more of the selectable regions on the display screen is adjacent the associated selectable region outside the display screen.

15 180. (previously presented) The apparatus of claim 178 wherein each of one or more of the selectable regions on the display screen indicates the location of the associated selectable region outside the display screen.

20 181. (previously presented) The apparatus of claim 178 wherein the plurality of selectable regions on the display screen together at least partially circumscribe a region on the display screen.

182. (previously presented) The apparatus of claim 170 further comprising an indicator for indicating the remaining dwell time required to select the intersected selectable region.

25 183. (previously presented) The apparatus of claim 170 wherein the movement related signal is responsive to the movement of a body member of an operator having impaired ability to sense the position of the body member and the apparatus further comprises a tactile indicator for indicating tactilely to the operator the position of the body member.

30 184. (previously presented) The apparatus of claim 170 further comprising an indicator for indicating

on the display screen the location of one of the successive locations located outside the display screen.

5 185. (previously presented) The apparatus of claim 170 further comprising an indicator for indicating on the display screen the distance between one of the successive locations located outside the display screen and the point on the display screen closest thereto.

10 186. (previously presented) The apparatus of claim 170 further comprising an operator fatigue detector for detecting operator fatigue and wherein the first quantity is further a function of detected operator fatigue.

187. (previously presented) The apparatus of claim 170 wherein the first dwell event includes a first quantity equalling or exceeding a predetermined quantity, the first quantity being a function of the duration of a period of intersection of two of the successive locations and the particular selectable region; and wherein the apparatus further includes an indicator for indicating the remaining dwell time required to select the particular menu option.

20 188. (previously presented) The apparatus of claim 187 further comprising a certain selectable region on the display screen, the certain selectable region associated with the particular selectable region; and wherein the first quantity is further a function of the duration of a period of intersection of two of the successive locations and the certain selectable region.

25 189. (previously presented) The apparatus of claim 170 wherein the particular menu option is associated with a submenu comprising a plurality of submenu options each associated respectively with one of the selectable regions; and wherein the selection device is further operative:

- 30 (a) to display on the display screen the submenu options, responsive to the first dwell event; and
(b) to select, responsive to a second dwell event, the submenu option associated with the selectable region associated with the second dwell event.

190. (previously presented) The apparatus of claim 170 wherein the particular selectable region is invisible.

5 191. (previously presented) The apparatus of claim 170 wherein the particular menu option is associated with a submenu comprising a plurality of submenu options each associated respectively with one of the selectable regions; and wherein the selection device is further operative to select, responsive to a second dwell event, the submenu option associated with the selectable region associated with the second dwell event.

10 192. (previously presented) The apparatus of claim 170 wherein the particular menu option represents a sequence of one or more words; and further comprising a voice output device for speaking the sequence of one or more words responsive to the selection device selecting the particular menu option.

15 193. (previously presented) The apparatus of claim 192 wherein the particular selectable region is invisible.

20 194. (previously presented) The apparatus of claim 192 wherein the selection device is responsive only to the first dwell event.

25 195. (previously presented) The apparatus of claim 170 further comprising a certain selectable region on the display screen, the certain selectable region associated with the particular selectable region; and wherein the first dwell event includes a first quantity equalling or exceeding a predetermined quantity, the first quantity being a function of:

- (a) the durations of one or more successive periods of intersection of two or more of the successive locations and the certain selectable region; and
- (b) the durations of one or more successive periods of intersection of two or more of the successive locations and the particular selectable region.

196. (previously presented) The apparatus of claim 170 further comprising a signal generating device, coupled to a device, for generating a device control signal corresponding to a device control function for controlling the device; wherein the particular menu option represents the device control function; and wherein the signal generating device, in response to the first dwell event, generates the device control signal.

197. (previously presented) The apparatus of claim 196 wherein the device includes any one of:

- (a) a computer peripheral;
- (b) a device capable of playing previously recorded sound;
- (c) a device capable of playing previously recorded video;
- (d) a household appliance;
- (e) a lamp;
- (f) a microprocessor;
- (g) a motorized transport device including either one of a scooter and a wheelchair;
- (h) a radio;
- (i) a robot;
- (j) a security system;
- (k) a television;
- (l) a thermostat;
- (m) a voice output device;
- (n) a workstation;
- (o) an alarm; and
- (p) an office appliance.

198. (previously presented) An apparatus for speaking a sequence of one or more words, said apparatus comprising:

- (a) a voice output device;
- (b) a plurality of sequences of one or more words, or a plurality of sequences of one or more symbols each sequence of one or more symbols representing one of the sequences of one or more words;

(c) a display screen including a working region with a periphery, the display screen capable of displaying a plurality of selectable regions adjacent the periphery of the working region, each of the selectable regions selectable by the user, each of the selectable regions associated respectively with and simultaneously displaying on the display screen one of the sequences of one or more words or symbols; and

(d) control means for:

- (1) receiving a movement related signal indicating a location with respect to the display screen responsive to user movement by a user, the user movement indicating a potential user selection;
- (2) in response to an intersection of the location and a particular one of the selectable regions, speaking, by means of the voice output device, the sequence of one or more words associated with the particular selectable region.

199. (previously presented) The voice output system of claim 114 further comprising:

(a) a computer system including the display screen and the movement related signal receiver; and

(b) a program, executable on the computer system;

and wherein each of the delimit device and the selection device is formed by the combination of the program and the computer system.

200. (previously presented) The voice output system of claim 114 wherein the voice output device is further responsive to a first quantity equalling or exceeding a predetermined quantity, the first quantity being a function of a ratio between:

(1) the durations of one or more successive periods of intersection of the movement related signal and the first particular selectable region or the activation area associated therewith; and

(2) the durations of one or more successive periods of intersection of the movement related signal and one of the selectable regions or the activation area associated therewith other than the particular selectable region.

201. (previously presented) The voice output system of claim 114 wherein the location indicated by the movement related signal is outside the display screen; and further comprising an indicator for indicating on the display screen the distance between the location indicated by the movement related signal outside the display screen and the point on the display screen closest thereto.


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202. (previously presented) The voice output system of claim 115 further comprising a user fatigue detector for detecting fatigue of the user; and wherein the predetermined period is a function of detected user fatigue.

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203. (previously presented) The voice output system of claim 147 wherein the specific menu option represents a class of related words, related sequences of words, or a combination thereof, the class including the particular sequence; and wherein the class includes any one of:

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- (a) actions;
 - (b) amounts;
 - (c) animals;
 - (d) articles of clothing;
 - (e) bodily functions;
 - (f) buildings;
 - (g) business activities;
 - (h) cleaning activities;
 - (i) colors;
 - (j) communication activities;
 - (k) computer peripherals;
 - (l) days;
 - (m) devices used to maintain personal hygiene;
 - (n) directions;
 - (o) drinks;
 - (p) emergency conditions;
 - (q) emotions;
 - (r) financial activities;

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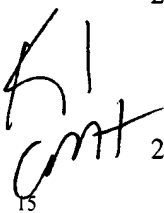
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- (s) foods;
- (t) government services;
- (u) greetings;
- (v) holidays;
- 5 (w) household appliances;
- (x) illnesses;
- (y) items of office equipment;
- (z) jokes;
- (aa) lengths;
- 10 (ab) locations, including locations frequented by an operator of the voice output system;
- (ac) meals;
- (ad) means of transportation;
- (ae) months;
- (af) names;
- (ag) numbers;
- (ah) parts of the human body;
- (ai) persons known to an operator of the voice output system;
- (aj) plants;
- (ak) prosthetic devices;
- 20 (al) recreational activities;
- (am) rehabilitation activities;
- (an) relative locations;
- (ao) school activities;
- (ap) shapes;
- 25 (aq) shopping activities;
- (ar) sizes;
- (as) smells;
- (at) sports;
- (au) tactile attributes;
- 30 (av) tastes;

- (aw) telephone numbers;
- (ax) temperatures;
- (ay) times;
- (az) topics of study;
- 5 (ba) utterances used as acknowledgements in conversation without conveying new substantive information;
- (bb) utterances used to bid for a turn to speak in conversation;
- (bc) weights; and
- (bd) work activities.

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204. (previously presented) The apparatus of claim 1 wherein the movement related signal receiving means is not flush against the display screen.


15 205. (previously presented) The apparatus of claim 1 wherein the movement related signal indicating successive locations is responsive to movement of a body member of a user over a one dimensional range of motion of the body member; and wherein the successive locations intersect the particular selectable region over at least five percent of the range of motion of the body member.

20 206. (new) An apparatus for selecting a desired option from a menu of two or more options shown on a display, the apparatus comprising:

- (a) a receiver for receiving a movement related signal indicating any one of two or more selectable regions, each of the selectable regions bordering an edge of a zone on the display, the selectable regions including a desired region associated with the desired option; and
- 25 (b) a processor, operatively connected to the receiver to receive the movement related signal, configured for:
 - (1) processing the movement related signal in response to the movement related signal overshooting the desired region and the edge of the zone at the location of the
 - 30 desired region, to indicate the desired region; and

- (2) selecting the desired option in response to the movement related signal indicating the desired region for a predetermined period of time.

207. (new) The apparatus of claim 206 further comprising an indicator, operatively connected to the processor, for indicating to a user that the movement related signal indicates the desired region.

208. (new) The apparatus of claim 207 wherein the indicator intersects the desired region.

209. (new) The apparatus of claim 208 wherein the indicator and the desired region are coterminous.

210. (new) The apparatus of claim 207 wherein the indicator is further operative to indicate a change in the duration of a period that the movement related signal indicates the desired region.

211. (new) The apparatus of claim 210 wherein the duration change indication includes a slight modification in any one of: hue, saturation, luminosity, volume, pitch, pressure, force, frequency, amplitude, and phase.

212. (new) The apparatus of claim 206 further comprising an indicator, operatively connected to the processor, for indicating to a user that the processor has selected the desired option.

213. (new) The apparatus of claim 212 wherein the selection indication includes a marked modification in any one of: hue, saturation, luminosity, volume, pitch, pressure, force, frequency, amplitude, and phase.

214. (new) The apparatus of claim 206 further comprising an indicator, operatively connected to the processor, for indicating to a user a change in the difference between:

- (a) the predetermined period of time; and
- (b) the duration of a period of time during which the movement related signal indicates the desired region.

215. (new) The apparatus of claim 214 wherein the difference change indication includes a modification in any one of: hue, saturation, luminosity, volume, pitch, pressure, force, frequency, amplitude, and phase.

5 216. (new) The apparatus of claim 206 wherein the movement related signal:

(a) indicates the desired region for a first period of time; and

(b) at a time after the first period, does not indicate the desired region; and

further comprising an indicator, operatively connected to the processor, for indicating to a user at a time after the first period that the movement related signal does not indicate the desired region.

10 217. (new) The apparatus of claim 206 wherein the movement related signal:

(a) indicates the desired region for a first period of time; and

(b) at a time after the first period, does not indicate the desired region for a second period of time; and

further comprising an indicator, operatively connected to the processor, for indicating to a user the duration of the second period of time.

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218. (new) The apparatus of claim 206 wherein the predetermined period equals or exceeds two hundred milliseconds.

20 219. (new) The apparatus of claim 206 wherein none of the selectable regions borders another of the selectable regions.

25 220. (new) The apparatus of claim 206 wherein the location of the desired option on the display indicates the location of the desired region relative to the display.

30 221. (new) The apparatus of claim 206 wherein the options include an undesired option; wherein the selectable regions include an undesired region bordering an edge of the zone on the display; wherein the undesired option is associated with the undesired region; and wherein the relation of the location of the undesired option on the display to the desired option on the display indicates

the relation of the location of the undesired region to the location of the desired region.

222. (new) The apparatus of claim 206 wherein the movement related signal is responsive to the movement of a body member of a user including any one of:

- (a) the head of the user;
- (b) an eye of the user;
- (c) a shoulder of the user;
- (d) an arm of the user;
- (e) an elbow of the user;
- (f) a wrist of the user;
- (g) a hand of the user;
- (h) a finger of the user;
- (i) a thumb of the user;
- (j) a knee of the user;
- (k) a leg of the user;
- (l) a foot of the user;
- (m) a toe of the user;
- (n) an ankle of the user; and
- (o) the trunk of the user.

223. (new) The apparatus of claim 206 wherein the movement related signal is responsive to movement of a body member of a user over a one dimensional range of motion of the body member; and wherein the movement related signal indicates the desired region over at least five percent of the range of motion of the body member.

224. (new) The apparatus of claim 206 wherein the processor is further configured for disabling selection of one or more of the selectable regions responsive to the selection of the desired option, while maintaining a power supply to the apparatus.

225. (new) The apparatus of claim 224 wherein one of the selectable regions is not disabled; and

wherein the processor is further configured for, after disabling one or more of the selectable regions, enabling selection of the one or more disabled selectable regions, responsive to the movement related signal indicating the non-disabled selectable region for a set period of time.

5 226. (new) The apparatus of claim 206 wherein the processor is further operative to represent the desired region as an area on a two dimensional map; wherein the receiver is further operative to represent the movement related signal as a location on the map; wherein the processor further comprises a comparator for comparing the location on the map and the area on the map to determine whether the location overshoots the area.

10 227. (new) An apparatus for selecting a desired submenu option from a menu hierarchy, the menu hierarchy including a menu including two or more menu options, the menu options including a desired menu option associated with a submenu including two or more submenu options, the submenu options including a desired submenu option, the apparatus comprising:

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- (a) a receiver for receiving a movement related signal indicating:
 - (1) any one of two or more first selectable regions, each of the first selectable regions bordering an edge of a first zone on a display, the first selectable regions including a first desired region associated with the desired menu option; and
 - (2) any one of two or more second selectable regions, each of the second selectable regions bordering an edge of a second zone on the display, the second selectable regions including a second desired region associated with the desired submenu option; and
 - (b) a processor, operatively connected to the receiver to receive the movement related signal, configured for:
 - 25 (1) processing the movement related signal in response to the movement related signal overshooting the first desired region and the edge of the first zone at the location of the first desired region, to indicate the first desired region;
 - (2) processing the movement related signal in response to the movement related signal overshooting the second desired region and the edge of the second zone at the location of the second desired region, to indicate the second desired region; and
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(3) selecting the desired submenu option in response to the movement related signal indicating:

- (i) the first desired region for a first predetermined period of time; and
- (ii) the second desired region for a second predetermined period of time.

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228. (new) The apparatus of claim 227 wherein the first desired region and the second desired region are any one of:

- (a) adjacent;
- (b) not adjacent;
- (c) overlapping;
- (d) not overlapping; and
- (e) coterminous.

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229. (new) The apparatus of claim 227 wherein:

- (a) each of the submenu options is associated respectively with one of the second selectable regions;
- (b) the submenu options are displayed simultaneously and physically grouped together on the display; and
- (c) the processor is further configured for, in response to the movement related signal indicating the desired region for the first predetermined period of time, displaying on the display each of the submenu options on, or in close proximity to, the second selectable region associated with the submenu option.

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230. (new) The apparatus of claim 227 wherein:

- (a) each of the submenu options is associated respectively with one of the second selectable regions;
- (b) the submenu options are displayed simultaneously and physically grouped together on the display; and
- (c) the location of the desired submenu option on the display indicates the location of the desired second selectable region relative to the display.

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231. (new) The apparatus of claim 227 wherein:

- (a) the submenu options include an undesired submenu option;
- (b) the second selectable regions include an undesired second selectable region associated with the undesired submenu option;
- (c) the desired and undesired submenu options are displayed simultaneously and physically grouped together on the display; and
- (d) the relation of the location of the desired submenu option on the display to the location of the undesired submenu option on the display indicates the relation of the location of the desired second selectable region to the location of the undesired second selectable region.

232. (new) The apparatus of claim 227 wherein the distance between the desired first selectable region and the desired second selectable region is a function of a frequency of use of the desired submenu option.

233. (new) The apparatus of claim 227 wherein:

- (a) the submenu options include an undesired submenu option;
- (b) the second selectable regions include an undesired second selectable region associated with the undesired submenu option;
- (c) the desired and undesired submenu options are displayed simultaneously and physically grouped together on the display;
- (d) the desired menu option is more frequently used than the undesired menu option; and
- (e) the distance between the desired first selectable region and the desired second selectable region is less than the distance between the desired first selectable region and the undesired second selectable region.

234. (new) A voice output system for speaking a desired sequence of one or more words, the voice output system comprising:

- (a) a receiver for receiving a movement related signal indicating any one of two or more selectable regions, each of the selectable regions bordering an edge of a zone on a display,

the selectable regions including a desired region associated with the desired sequence;

- (b) a voice output device, operatively connected to the receiver to receive the movement related signal, for:
- (1) processing the movement related signal in response to the movement related signal overshooting the desired region and the edge of the zone at the location of the desired region, to indicate the desired region; and
 - (2) speaking the desired sequence in response to the movement related signal indicating the desired region for a predetermined period of time.

235. (new) The voice output system of claim 234 further comprising the display for displaying a sequence of one or more graphic symbols representing the desired sequence, the sequence of graphic symbols including any one of:

- (a) a letter of an alphabet;
- (b) a sign of a sign language;
- (c) an ideograph of an ideographic language; and
- (d) a symbol of a symbol set including any one of:
 - (1) the Picture Communication Symbols symbol set;
 - (2) the Rebus symbol set;
 - (3) the Picsyms symbol set;
 - (4) the Pictogram Ideogram Communication Symbols symbol set;
 - (5) the Yerkish symbol set;
 - (6) the Blissymbolics symbol set;
 - (7) the Self-Talk symbol set;
 - (8) the Imaginart symbol set;
 - (9) the DynaSyms symbol set;
 - (10) the Oakland Picture Dictionary symbol set;
 - (11) the Talking Pictures symbol set;
 - (12) the Minspeak symbol set;
 - (13) the Unity symbol set; and
 - (14) the Core Picture Vocabulary symbol set.

236. (new) The voice output system of claim 234 wherein each of the selectable regions is associated respectively with a sequence of one or more words, each of the sequences belonging to a meaning class.

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237. (new) The voice output system of claim 236 wherein the meaning class is any one of:

- (a) actions;
- (b) amounts;
- (c) animals;
- (d) articles of clothing;
- (e) bodily functions;
- (f) buildings;
- (g) business activities;
- (h) cleaning activities;
- (i) colors;
- (j) communication activities;
- (k) computer peripherals;
- (l) days;
- (m) devices used to maintain personal hygiene;
- (n) directions;
- (o) drinks;
- (p) emergency conditions;
- (q) emotions;
- (r) financial activities;
- (s) foods;
- (t) government services;
- (u) greetings;
- (v) holidays;
- (w) household appliances;
- (x) illnesses;

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- (y) items of office equipment;
- (z) jokes;
- (aa) lengths;
- (ab) locations, including locations frequented by an operator of the voice output system;
- 5 (ac) meals;
- (ad) means of transportation;
- (ae) months;
- (af) names;
- (ag) numbers;
- 10 (ah) parts of the human body;
- (ai) persons known to an operator of the voice output system;
- (aj) plants;
- (ak) prosthetic devices;
- (al) recreational activities;
- 15 (am) rehabilitation activities;
- (an) relative locations;
- (ao) school activities;
- (ap) shapes;
- (aq) shopping activities;
- 20 (ar) sizes;
- (as) smells;
- (at) sports;
- (au) tactile attributes;
- (av) tastes;
- 25 (aw) telephone numbers;
- (ax) temperatures;
- (ay) times;
- (az) topics of study;
- (ba) utterances used as acknowledgements in conversation without conveying new substantive
- 30 information;

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- (bb) utterances used to bid for a turn to speak in conversation;
- (bc) weights; and
- (bd) work activities.

5 238. (new) The voice output system of claim 234 wherein each of the selectable regions is associated respectively with a sequence of one or more words, each of the sequences beginning with a common sequence of one or more letters.

10 239. (new) The voice output system of claim 234 wherein each of the selectable regions is associated respectively with a sequence of two or more words, each of the sequences including a common word.

240. (new) A device controller for outputting a device control signal to a controlled device, the device controller comprising:

- 15 (a) a receiver for receiving a movement related signal indicating any one of two or more selectable regions, each of the selectable regions bordering an edge of a zone on a display, the selectable regions including a desired region associated with the device control signal; and
- 20 (b) a processor, operatively connected to the receiver and to the controlled device, configured for:
- (1) processing the movement related signal in response to the movement related signal overshooting the desired region and the edge of the zone at the location of the desired region, to indicate the desired region; and
 - (2) outputting the device control signal to the controlled device in response to the
- 25 movement related signal indicating the desired region for a predetermined period of time.

241. (new) The device controller of claim 240 wherein the controlled device includes any one of:

- (a) a computer peripheral;
- (b) a device capable of playing previously recorded sound;

- (c) a device capable of playing previously recorded video;
- (d) a household appliance;
- (e) a lamp;
- (f) a microprocessor;
- 5 (g) a motorized transport device including either one of a scooter and a wheelchair;
- (h) a radio;
- (i) a robot;
- (j) a security system;
- (k) a television;
- 10 (l) a thermostat;
- (m) a voice output device;
- (n) a workstation;
- (o) an alarm; and
- (p) an office appliance.

15 242. (new) The device controller of claim 240 wherein the controlled device is a motorized wheelchair; and wherein the device control signal controls any one of:

- (a) a direction of movement of the wheelchair;
- (b) a velocity of movement of the wheelchair; and
- 20 (c) a braking of the wheelchair.

243. (new) The device controller of claim 240 further comprising the controlled device and a pointer, operatively connected to the receiver, for generating the movement related signal.

25 244. (new) For use with a computer system capable of executing an application program, the computer system including a display, an apparatus for providing a desired input to the application program, the apparatus comprising:

- (a) a carrier readable by the computer system; and
- (b) a program on the carrier, the program executable by the computer system, for:
 - 30 (1) receiving a movement related signal indicating any one of two or more selectable

regions, each of the selectable regions bordering an edge of a zone on the display,
the selectable regions including a desired region associated with the desired input;

- (2) processing the movement related signal in response to the movement related signal overshooting the desired region and the edge of the zone at the location of the desired region, to indicate the desired region; and
- (3) providing the desired input to the application program in response to the movement related signal indicating the desired region for a predetermined period of time.

245. (new) The apparatus of claim 244 wherein the carrier includes any one of:

- (a) a random access memory;
- (b) a magnetic store;
- (c) an optical store; and
- (d) a communications network.

246. (new) The apparatus of claim 244 wherein the application program includes any one of:

- (a) a program for word processing;
- (b) a program for browsing the internet;
- (c) a program for transferring electronic mail;
- (d) a program for learning to read a written language;
- (e) a program for learning to speak a spoken language;
- (f) a program for learning mathematics; and
- (g) a program for controlling a device operatively connected to the computer system.

247. (new) The apparatus of claim 244 further comprising:

- (a) the computer system;
- (b) a pointer, operatively connected to the computer system, for generating the movement related signal; and
- (c) the application program.


248. (new) An apparatus for selecting a desired option from a menu of two or more options shown on

a display, the apparatus comprising:

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- (a) a receiver for receiving a movement related signal indicating any one of two or more selectable regions, each of the selectable regions bordering an edge of a zone on the display, the selectable regions including a desired region associated with the desired option;
 - (b) a confiner, operatively connected to the selectable regions and the receiver, configured for:
 - (1) confining the movement related signal within the union of the zone and the selectable regions; and
 - (2) selecting the desired option in response to the movement related signal indicating the
10 desired region for a predetermined period of time.

249. (new) The apparatus of claim 248 further comprising an indicator, operatively connected to the confiner, for indicating to a user that the movement related signal indicates the desired region.

15 250. (new) The apparatus of claim 249 wherein the indicator intersects the desired region.

 251. (new) The apparatus of claim 250 wherein the indicator and the desired region are coterminous.

20 252. (new) The apparatus of claim 249 wherein the indicator is further operative to indicate a change in the duration of a period that the movement related signal indicates the desired region.

25 253. (new) The apparatus of claim 252 wherein the duration change indication includes a slight modification in any one of: hue, saturation, luminosity, volume, pitch, pressure, force, frequency, amplitude, and phase.

254. (new) The apparatus of claim 248 further comprising an indicator, operatively connected to the confiner, for indicating to a user that the confiner has selected the desired option.

30 255. (new) The apparatus of claim 254 wherein the selection indication includes a marked modification in any one of: hue, saturation, luminosity, volume, pitch, pressure, force, frequency,

amplitude, and phase.

256. (new) The apparatus of claim 248 further comprising an indicator, operatively connected to the confiner, for indicating to a user a change in the difference between:

- (a) the predetermined period of time; and
- (b) the duration of a period of time during which the movement related signal indicates the desired region.

257. (new) The apparatus of claim 256 wherein the difference change indication includes a modification in any one of: hue, saturation, luminosity, volume, pitch, pressure, force, frequency, amplitude, and phase.

258. (new) The apparatus of claim 248 wherein the movement related signal:

- (a) indicates the desired region for a first period of time; and
 - (b) at a time after the first period, does not indicate the desired region; and
- further comprising an indicator, operatively connected to the confiner, for indicating to a user at a time after the first period that the movement related signal does not indicate the desired region.

259. (new) The apparatus of claim 248 wherein the movement related signal:

- (a) indicates the desired region for a first period of time; and
- (b) at a time after the first period, does not indicate the desired region for a second period of time; and

further comprising an indicator, operatively connected to the confiner, for indicating to a user the duration of the second period of time.


260. (new) The apparatus of claim 248 wherein the predetermined period equals or exceeds two hundred milliseconds.

261. (new) The apparatus of claim 248 wherein none of the selectable regions borders another of the selectable regions.

262. (new) The apparatus of claim 248 wherein the location of the desired option on the display indicates the location of the desired region relative to the display.

5 263. (new) The apparatus of claim 248 wherein the options include an undesired option; wherein the selectable regions include an undesired region bordering an edge of the zone on the display; wherein the undesired option is associated with the undesired region; and wherein the relation of the location of the undesired option on the display to the desired option on the display indicates the relation of the location of the undesired region to the location of the desired region.

10 264. (new) The apparatus of claim 248 wherein the movement related signal is responsive to the movement of a body member of a user including any one of:


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- (a) the head of the user;
 - (b) an eye of the user;
 - (c) a shoulder of the user;
 - (d) an arm of the user;
 - (e) an elbow of the user;
 - (f) a wrist of the user;
 - (g) a hand of the user;
 - 20 (h) a finger of the user;
 - (i) a thumb of the user;
 - (j) a knee of the user;
 - (k) a leg of the user;
 - (l) a foot of the user;
 - 25 (m) a toe of the user;
 - (n) an ankle of the user; and
 - (o) the trunk of the user.

30 265. (new) The apparatus of claim 248 wherein the movement related signal is responsive to movement of a body member of a user over a one dimensional range of motion of the body

member; and wherein the movement related signal indicates the desired region over at least five percent of the range of motion of the body member.

5 266. (new) The apparatus of claim 248 wherein the confiner is further configured for disabling selection of one or more of the selectable regions responsive to the selection of the desired option, while maintaining a power supply to the apparatus.

10 267. (new) The apparatus of claim 266 wherein one of the selectable regions is not disabled; and wherein the confiner is further configured for, after disabling one or more of the selectable regions, enabling selection of the one or more disabled selectable regions, responsive to the movement related signal indicating the non-disabled selectable region for a set period of time.

15  268. (new) The apparatus of claim 248 wherein the confiner is further operative to represent the union as an area on a two dimensional map; wherein the receiver is further operative to represent the movement related signal as a location on the map; wherein the confiner further comprises a comparator for comparing the location on the map and the area on the map to determine whether the location is outside the area.

20 269. (new) The apparatus of claim 248 wherein the confiner further comprises a timer for timing a period during which the movement related signal indicates the desired region.

270. (new) An apparatus for selecting a desired option from a menu of two or more options shown on a display, the apparatus comprising:

- 25 (a) a receiver for receiving a movement related signal responsive to movement of a body member of a user other than either of the user's eyes, the movement related signal indicating any one of two or more selectable regions, each of the selectable regions located outside the display, the selectable regions including a desired region associated with the desired option; and
- 30 (b) a processor, operatively connected to the receiver to receive the movement related signal, configured for selecting the desired option in response to the movement related signal

indicating the desired region for a predetermined period of time.

5 271. (new) The apparatus of claim 270 wherein each of the selectable regions is associated respectively with one of the options shown on the display; and wherein the location of each option on the display indicates the location of the associated selectable region.

272. (new) A method of enabling a user to select a desired option from a menu of two or more options shown on a display, the method comprising the steps of:

10 providing, bordering an edge of a zone on the display, two or more selectable regions including a desired region associated with the desired option;

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15 receiving from the user a movement related signal for indicating any one of the selectable regions;

processing the movement related signal in response to the movement related signal overshooting the desired region and the edge of the zone at the location of the desired region, to indicate the desired region; and

20 selecting the desired option in response to the movement related signal indicating the desired region for a predetermined period of time.

25 273. (new) The method of claim 272 wherein the desired region is located either outside the zone or inside the zone.

274. (new) The method of claim 272 further comprising the step of indicating to the user any one of:

- 30 (a) after the receiving step, the period of time during which the movement related signal indicates the desired region;
- (b) after the receiving step, the difference between (1) the predetermined period of time, and (2) the period of time during which the movement related signal indicates the desired

region;

- (c) that the movement related signal has overshot the desired region and the edge of the zone at the location of the desired region; and
- (d) that the desired option has been selected.

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275. (new) A method of enabling a user to select a desired option from a menu of two or more options shown on a display, the method comprising the steps of:

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providing, outside the display, two or more selectable regions including a desired region associated with the desired option;

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receiving from the user a movement related signal for indicating any one of the selectable regions, the movement related signal responsive to movement of a body member of the user other than either of the user's eyes; and

selecting the desired option in response to the movement related signal indicating the desired region for a predetermined period of time.

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276. (new) A method of enabling a user to select a desired option from a menu of two or more options shown on a display, the method comprising the steps of:

providing, bordering an edge of a zone on the display, two or more selectable regions including a desired region associated with the desired option;

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receiving from the user a movement related signal indicating any one of the selectable regions;

confining the movement related signal within the union of the zone and the selectable regions; and

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selecting the desired option in response to the movement related signal indicating the desired

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region for a predetermined period of time.
